

SEPA Flood Risk Science - Evidence base for Forestry NFM role

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Introduction

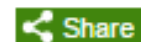
- Flood risk in Scotland
- Sustainable FRM
- Potential effects of forestry and flooding.
- Catchment scale effects.
- Woody debris.
- Opportunities for working together.
- Guidance development/evidence.

Sustainable Flood Risk Management

- 95,000 residential and 11,000 non residential properties at risk of flooding from rivers or surface water in Scotland.
- Approximately 20% of properties in rural areas.
- Flood risk is projected to increase due to climate change.
- Traditionally hard flood defences used to manage flood risk.
 - Expensive, low cost benefit for small communities/isolated properties
 - Loss of amenity
 - Environmental impact
 - Public perception



28 August 2014 Last updated at 10:52



Dumfries River Nith flood barrier row breaks out

► News ► Local News ► Dumfries

'Disaster' warning over Whitesands flood wall plan

12:02, 29 August 2014 | By Magdalene Dalziel

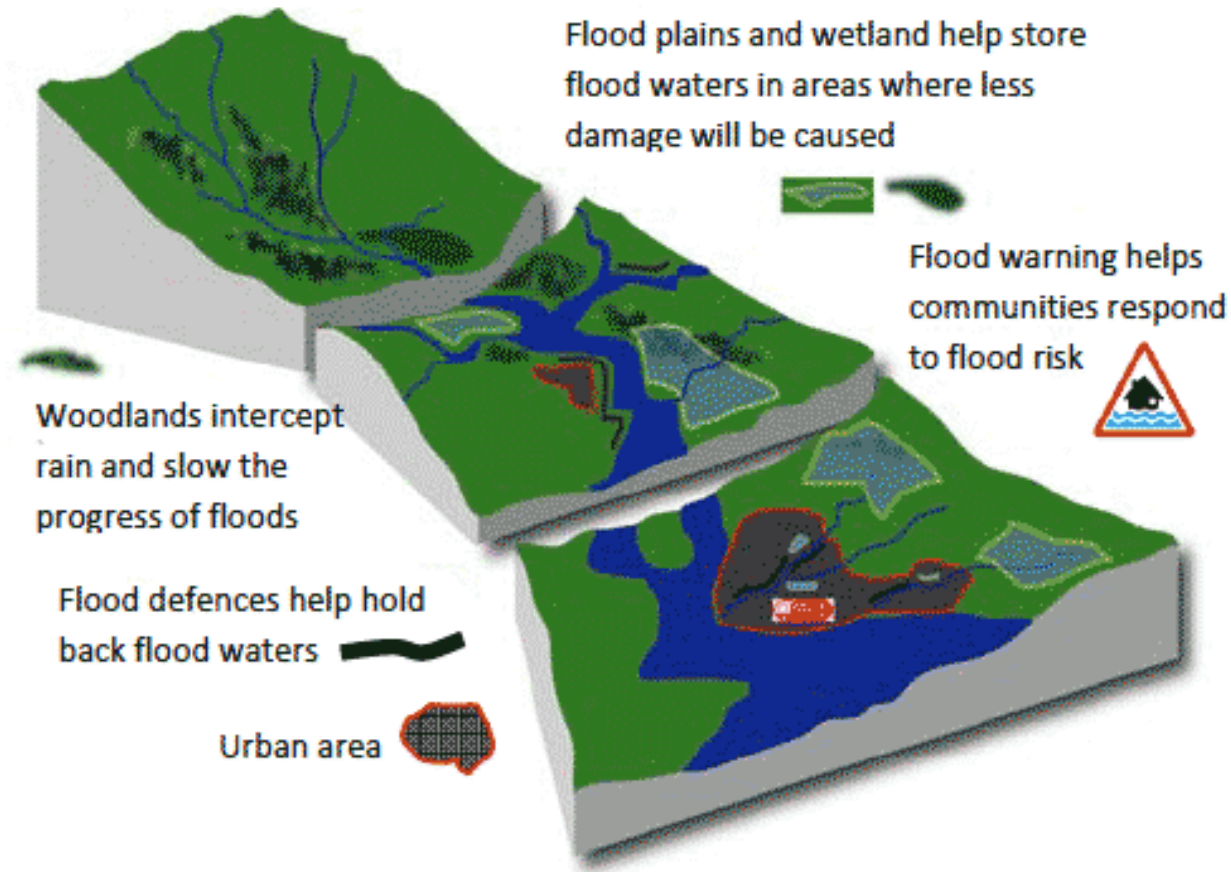
Community council vice-chairman Father Andrew Crosbie: "This wall will be 3.4 metres high which is basically twice the height of a person.

"There will be no view of the river any more which will change the face of Dumfries forever.

"I am all for a proper flood protection scheme but we need to be careful and be sure this is the right way to do it.

Sustainable Flood Risk Management

- Flood Risk Management (Scotland) Act 2009 establishes principle of Sustainable Flood Risk Management
 - Whole catchment approach
 - 'Working with nature' or natural flood management (NFM).
- Scottish Forest strategy. Area of woodland cover to increase from 17% to 25% by the second half of the 21st Century.



Potential Benefits and Risks of Forestry for Flood Risk Management

Benefits

- Catchment woodlands increase water use and increase infiltration thus reducing runoff.
- Floodplain woodlands and debris dams increase roughness slowing flow and increasing storage.
- Sediment is trapped within woodlands reducing deposition downstream.

Risks

- Water levels are increased upstream due to higher roughness.
- Changes to synchronicity (ie coincidence of peaks from subcatchments).
- Woody debris blocks structures.
- Debris dams fail.

Risks (mitigated by Forest and Water Guidelines)

- Felling reduces infiltration and increases runoff.
- Management techniques during planting and felling phases may increase runoff and/or sediment supply.
- Changes to the drainage network.

Catchment scale effects of forestry on flood risk

- Science / evidence base for catchment scale effects of forestry limited, although developing.
- Data based studies
 - Plot scale studies show improved infiltration
 - Few catchment scale studies
 - relatively short data records available
 - difficulty with isolating effect of woodland from the effects of varying land uses and climate change.
 - In general no evidence of benefit at catchment scale.
- Model based studies
 - suggests that woodlands may have an effect on flooding for some catchments. This appears to be particularly true for floodplain woodlands.
 - Siting of woodland and features can be important.

Woody Debris and Flood Risk



Scottish Borders (© Tweed Forum).

Forest Research).

constrictions along the main River Enrick.
Photos taken during the 1990s after some of the
major events (Forestry Commission / Highland
Council)

Pickering Beck - forestry industry working with partners to reduce flooding

- Combination of measures projected to reduce probability of flooding from 25% to 4% or less in any given year.
- Debris dams ~170.
- Riparian woodland planting –Farm woodland on vulnerable soils
- Amending forest plans and restoring streamside buffer zones
 - avoiding felling >20% of a catchment in any 3 year period to avoid temporary loss of woodland cover.
 - creating wider riparian buffer zones alongside main watercourses to slow flood flows and reduce bank erosion,
 - flagging opportunities when felling to construct LWD dams within incised watercourses.
- Flood storage bund with capacity of 120,000 m³/s. Compared with NFM measures in Pickering Beck of 4,000m³.
- NFM extends performance of hard measures.
- Monitoring installed, but drive to implement measures meant little base line data collected.

Opportunities through FRM Process - Mapping and FRM Strategies

- <http://map.sepa.org.uk/floodmap/map.htm>
 - Potentially vulnerable areas
 - Flood extents
 - Flood risk
 - NFM opportunity mapping and woodlands for water maps.
- FRM strategies identify areas where further investigation of NFM required.





Opportunities for engagement through LUP planning process

- Strategic Environmental Assessment (SEA) of high level plans
 - National strategic plan for forestry
 - District strategic plan
 - Local development plans (should consider forestry in relation to development).
- SEPA will be consulted through SEA and plan making process. Early engagement with SEPA important.
- Forestry Commission have Risk/Hazard and NFM Maps – how can we help in the use of them?
- Individual forest plans not covered by SEA.

Evidence and Guidance Development

- Need more pre planting monitoring to understand impacts, particularly in a Scottish context.
- Evidence base important in understanding risks/benefits
 - avoid conclusions based on perception.
 - lack of evidence limits uptake of forestry as NFM measure?
 - flood risk issues not considered in planning new forestry?
 - Missed opportunities for working together?
- Guidance development – best practise – joint working
 - SEPA Guidance
 - Natural Flood Management Handbook
 - Modelling Guidance; consideration of sensitivity assessment
 - Technical Guidance for Stakeholders
- Use of Forestry Commission best practise guidelines – how they are implemented, delivered on the ground.



Forestry and Natural Flood Management Summary

- Science and Evidence developing
- Joint working / consultation essential
- Shared understanding of benefits and risks
- Implementation of Best Practise – ‘delivery on the ground’
- Building confidence between stakeholders